

DOCKET NO. **SA- 516**

EXHIBIT NO. **4**

**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C**

WITNESSES 4 - RADAR DATA FOR MISSILE VISIBILITY TESTS

(138 Pages)


NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, D.C. 20594

August 9, 2000

Witnesses 4 - Radar Data for Missile Visibility Tests

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National Transportation Safety Board
Office of Research and Engineering 

A. ACCIDENT: DCA-96-MA-070

Location: East Moriches, New York
Date: July 17, 1996
Time: 2031 Eastern Daylight Time
Airplane: Boeing 747-131, N93119

B. GROUP

Not Applicable

C. SUMMARY

On July 17, 1996, at 2031 EDT, a Boeing 747-131, N93119, crashed into the Atlantic Ocean, about 8 miles south of East Moriches, New York, after taking off from John F. Kennedy International Airport (JFK). The airplane was being operated on an instrument flight rules (IFR) flight plan under the provisions of Title 14, Code of Federal Regulation (CFR), Part 121, on a regularly scheduled flight to Charles De Gaulle International Airport (CDG), Paris, France, as Trans World Airlines (TWA) Flight 800. The airplane was destroyed by explosion, fire, and impact forces with the ocean. All 230 people aboard were killed.

In support of the investigation into the TWA Flight 800 accident, radar data was obtained for the area surrounding Fort Walton Beach, Florida, during a missile visibility test on the evening of 29 April 2000 between 0000 and 0130 UTC time.

D. DETAILS OF THE INVESTIGATION

Radar data was obtained from the United States Air Force 84th Radar Evaluation Squadron (RADES) for 0000 UTC to 0130 UTC for the evening of 29 April. This corresponds to the time of day on 29 April 2000 when the Safety Board performed several missile visibility tests. RADES radar data included primary, secondary, and reinforced¹ radar targets from the following radar sites: Fort Green, FL (FTG); Slidell, LA (SLD); Tyndall Air Force Base, FL (TYN); Citronelle, AL (QRB); Cross City, FL (CCY); Whitehouse, FL (WHT). Three of the tests, which involved firing of a portable MANPADS missile, occurred between 0030 and 0100 UTC. The radar data for this time was examined to determine if the missile appeared as a primary radar return. The missile was launched at a high angle, though less than 90 degrees, aimed in a southerly direction. The prevailing upper level and surface winds at the time were north-northwesterly. Launch times were 0031:01, 0035:00, and 0050:02 UTC. The missile flew for less than 20 seconds before self-destruction.

Radar data between 0030:00 and 0035:00 UTC is plotted in figure 1, covering an area of approximately 130x80 nautical miles (nm). Figure 2 shows the data between 0030:00 and 0037:00 UTC, and figure 3 shows the data between 0030:00 and 0100:00 UTC.

All of the primaries that appeared in the area of the launch between 0030 and 0100 are plotted over a smaller area near the launch site in figure 4, with the times noted. The symbols denoted with “x” appeared after the first launch, and the symbols denoted with a box “□” appeared after the third launch. No primary returns were noted in the area after the second launch. In each case the primaries occurred after the time of missile self-destruct, and there is no identifiable ground track that can be associated with the test missiles. All the data between 0030 and 0100 is shown in tabular form in attachment I.



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¹ A “primary” only target is received as a reflection of radar energy only. A “secondary” or “beacon” only target is recorded as a response of the aircraft’s transponder to interrogation by the radar system. A “reinforced” target is recorded by the radar system in lieu of a primary or secondary target when transponder information is coincident with and reinforces a reflection of radar energy. Generally, secondary and reinforced returns are referred to as “secondary” targets.

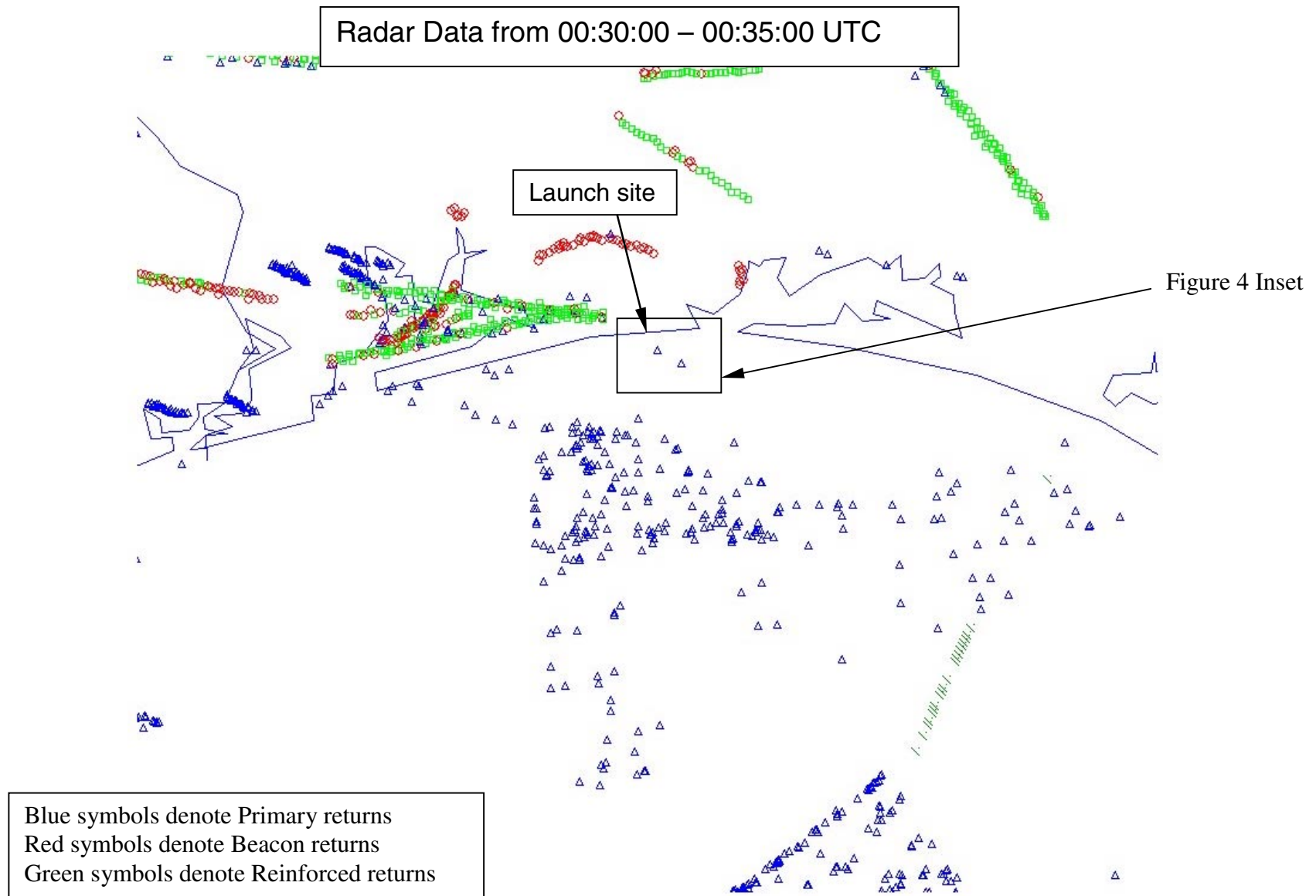


Figure 1 RADES Radar Data, 5 minute Duration

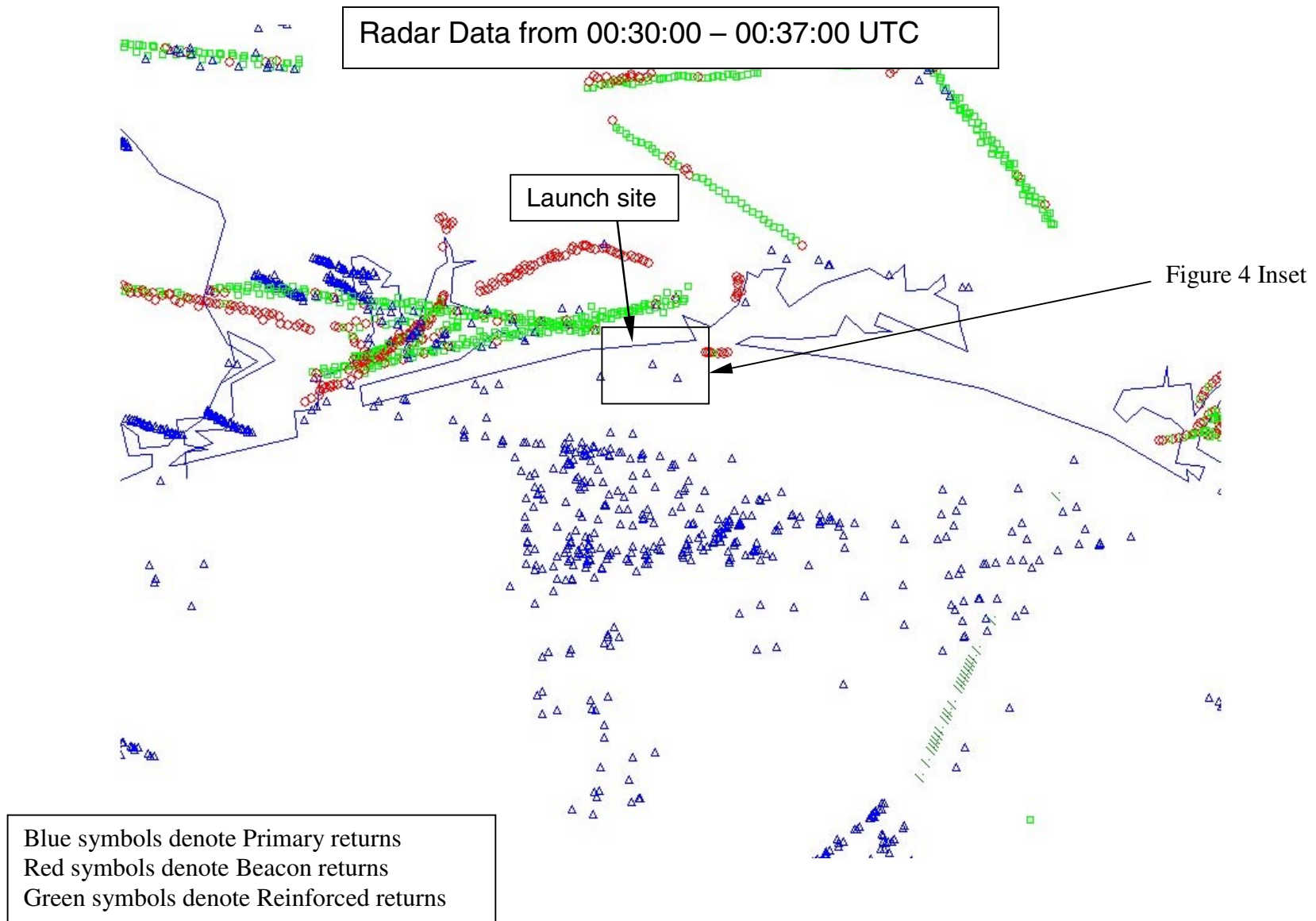


Figure 2 RADES Radar Data, 7 minute Duration

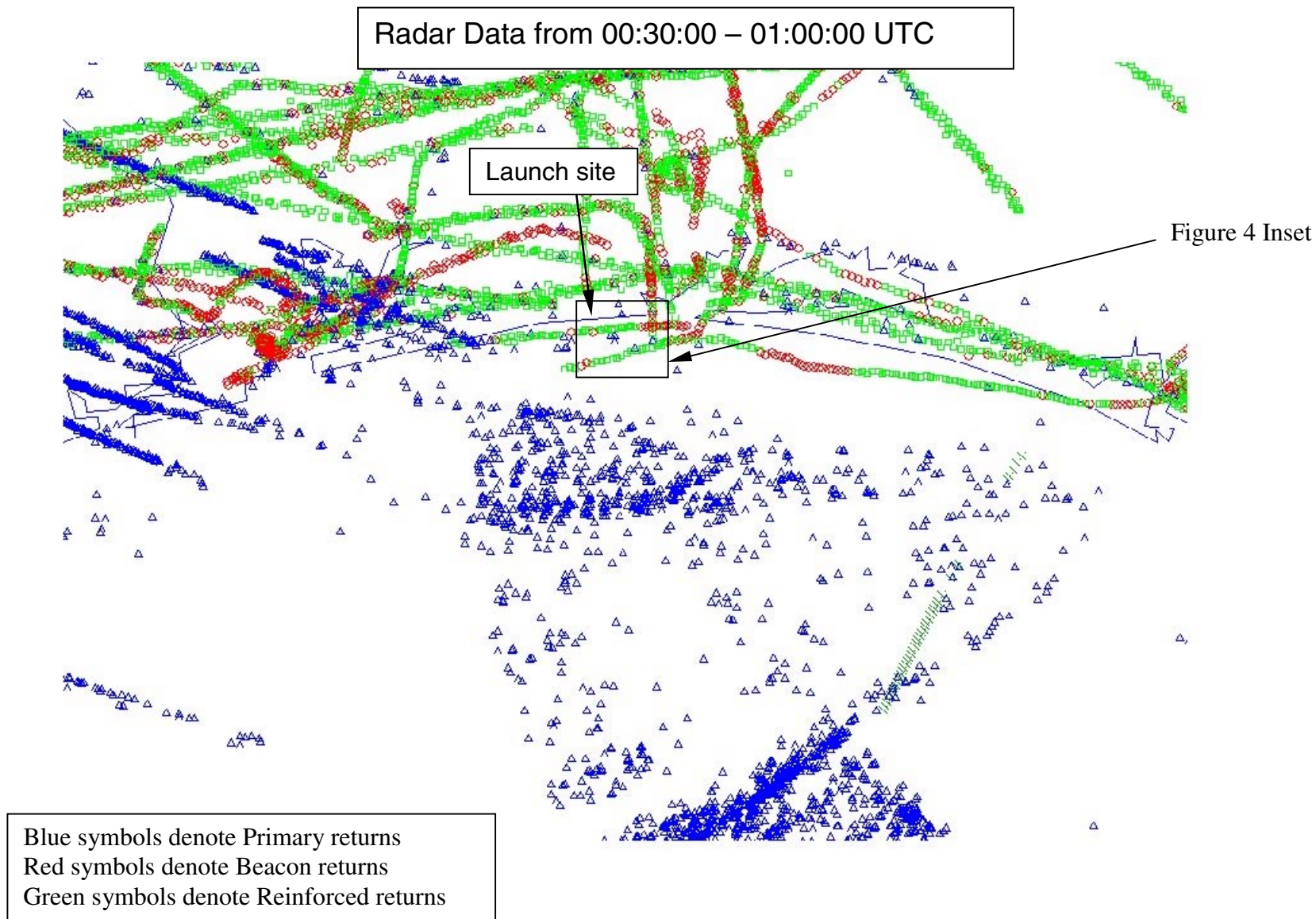


Figure 3 RADES Radar Data, 30 minute Duration

Figure 4 All Primary Radar Data close to Launch Site
Between 0030 – 0100 UTC

